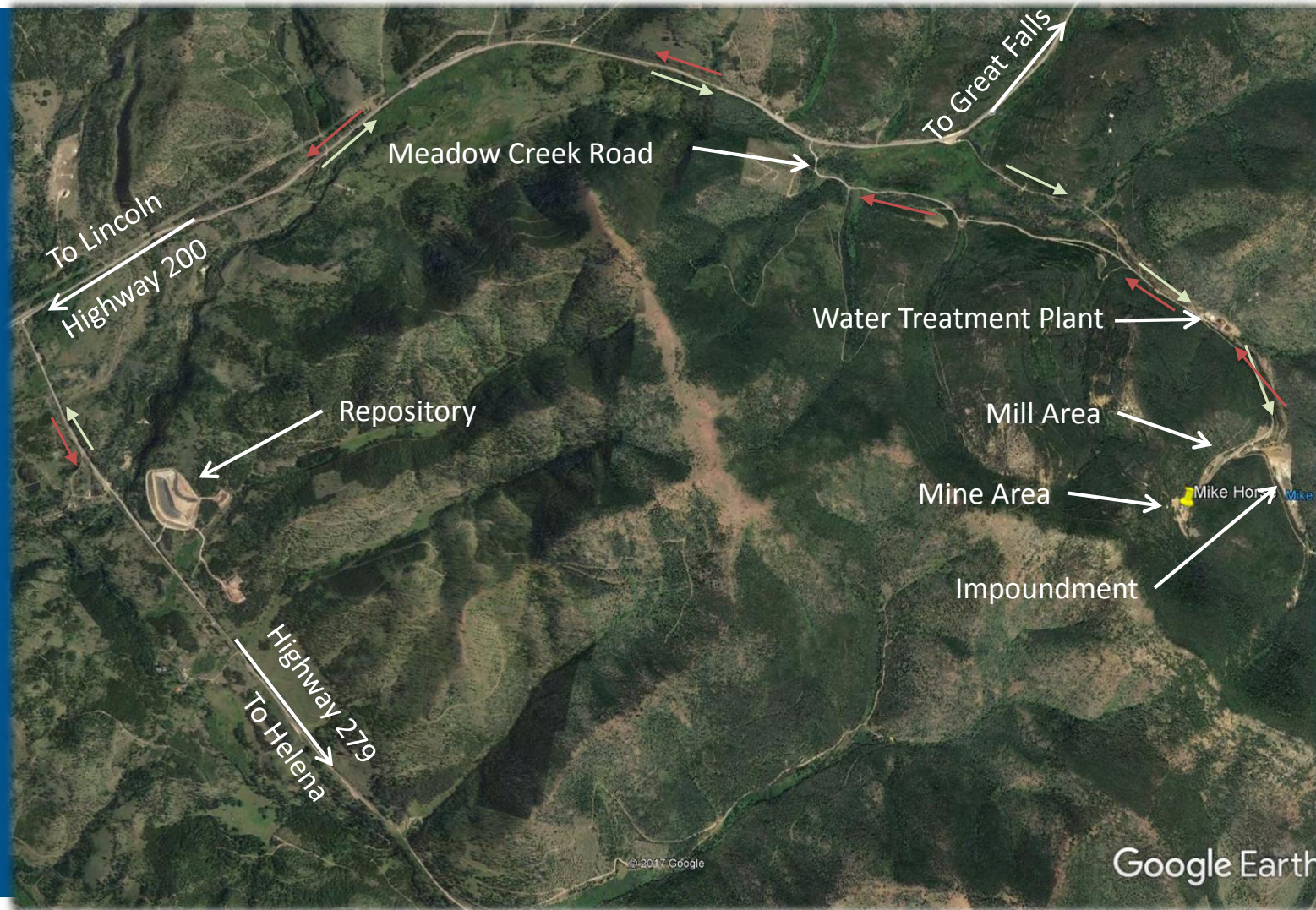
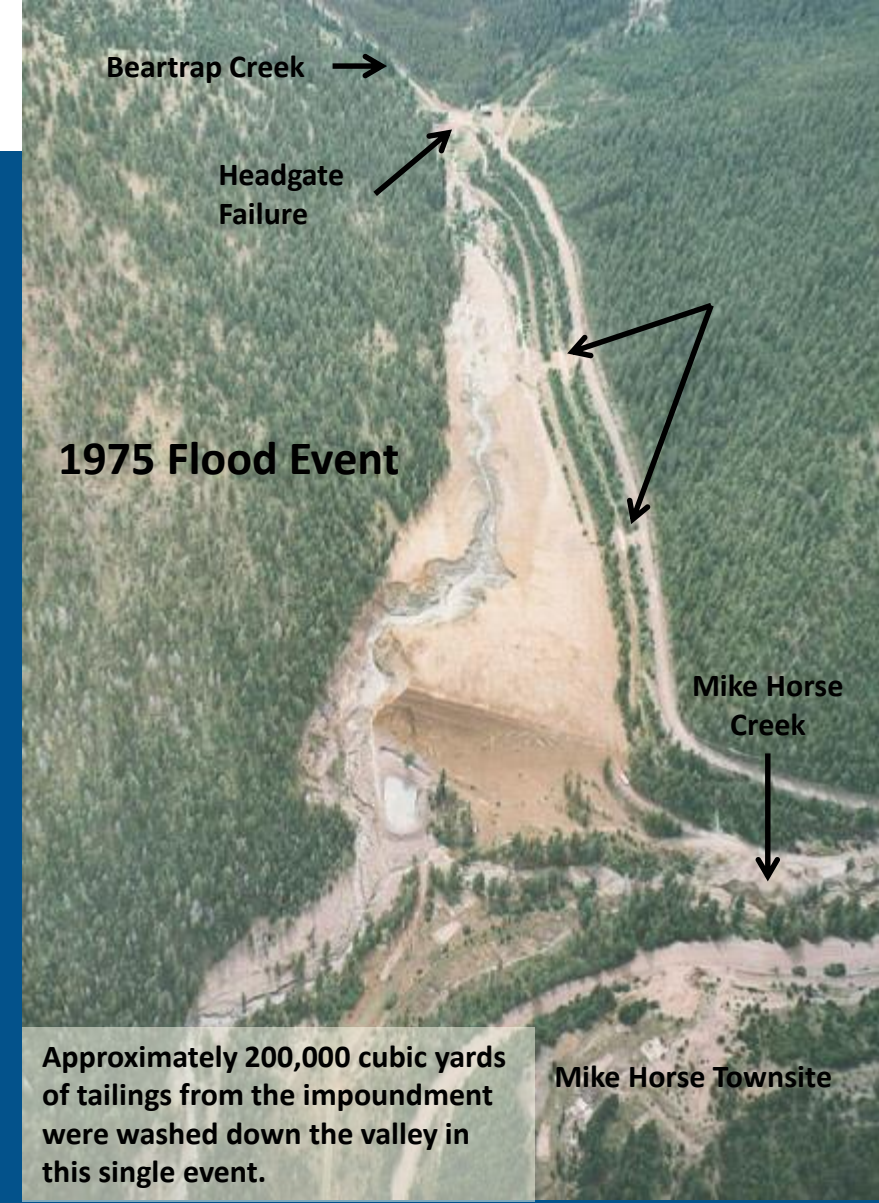
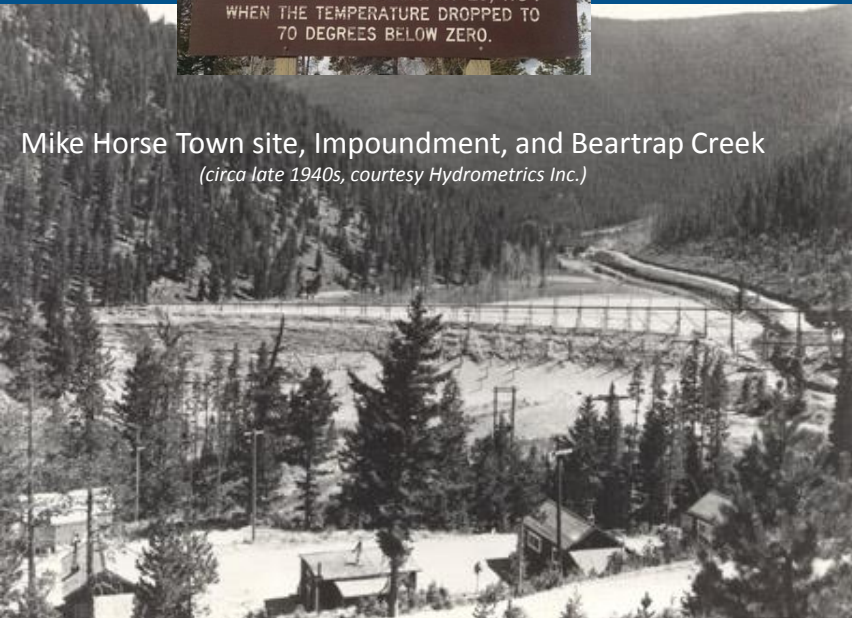


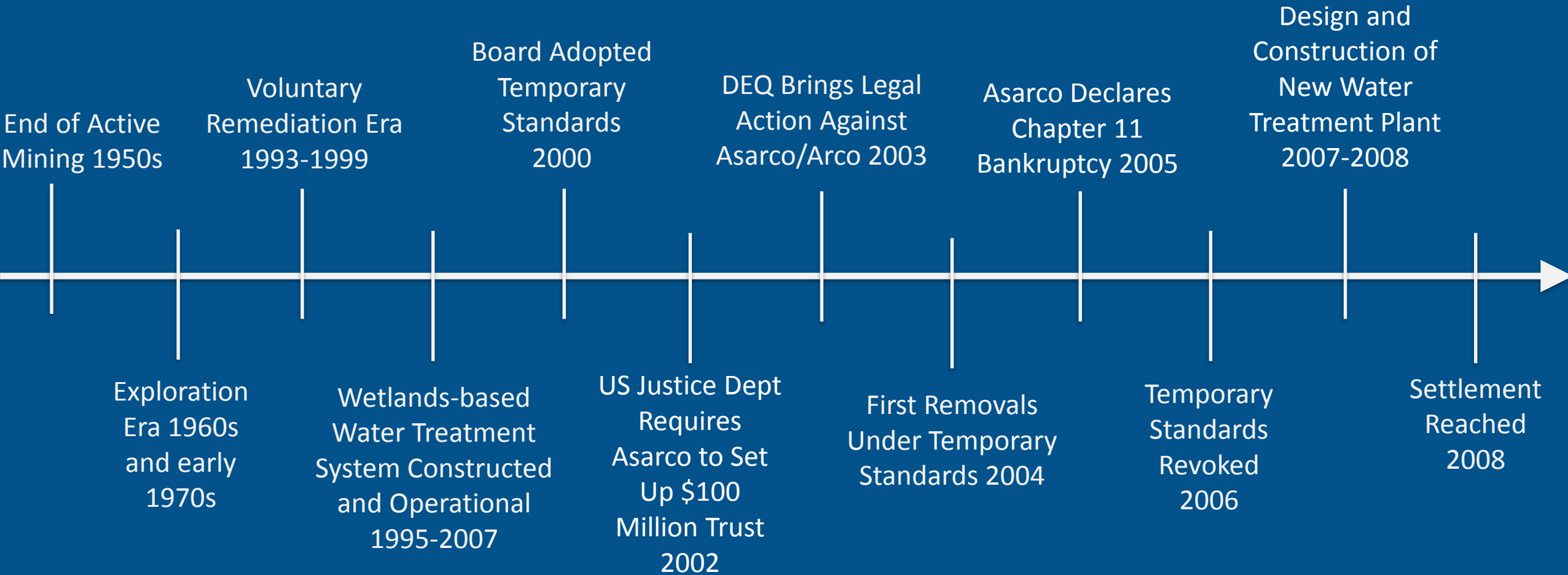
Site Overview



UBMC History



Timeline



Revocation of Temporary Standards

Conditions for Board to Terminate a Temporary Standard

- Water quality has improved to the point where all designated uses are met
- The petitioned waterbody has been reclassified
- The implementation plan is not being implemented according to the plan's schedule

Not Meeting Plan Implementation Deadlines and Other Reasons

- Work plans were not submitted on time
- Removal work did not occur as scheduled
- Looming bankruptcy created urgency to do something about water treatment

Temporary Standards were revoked by the Board of Environmental Review in December 2006



Bankruptcy Settlement

In 2008, the U.S. Forest Service issued an assessment of cleanup needs on NFS land (operating under their delegated authority from federal superfund). At the same time, Montana's Department of Justice Natural Resource Damages Program and Department of Environmental Quality, and the U.S. Department of Justice and Forest Service filed a bankruptcy claim for environmental damages caused by mining in the area. The existing companies involved with the mining area were ARCO and ASARCO, whose histories trace back to the Anaconda Company and American Smelting and Refining Company, respectively. Monies received in this bankruptcy settlement are what fund the work today. In order to improve both cost and cleanup efficiencies, the agencies are working in partnership on this project.

Settlement Funds

\$8M – ARCO

\$8M – ASARCO

\$23M – ASARCO Unsecured claims

\$39M Total – Jointly held by DEQ and DOJ-NRDP

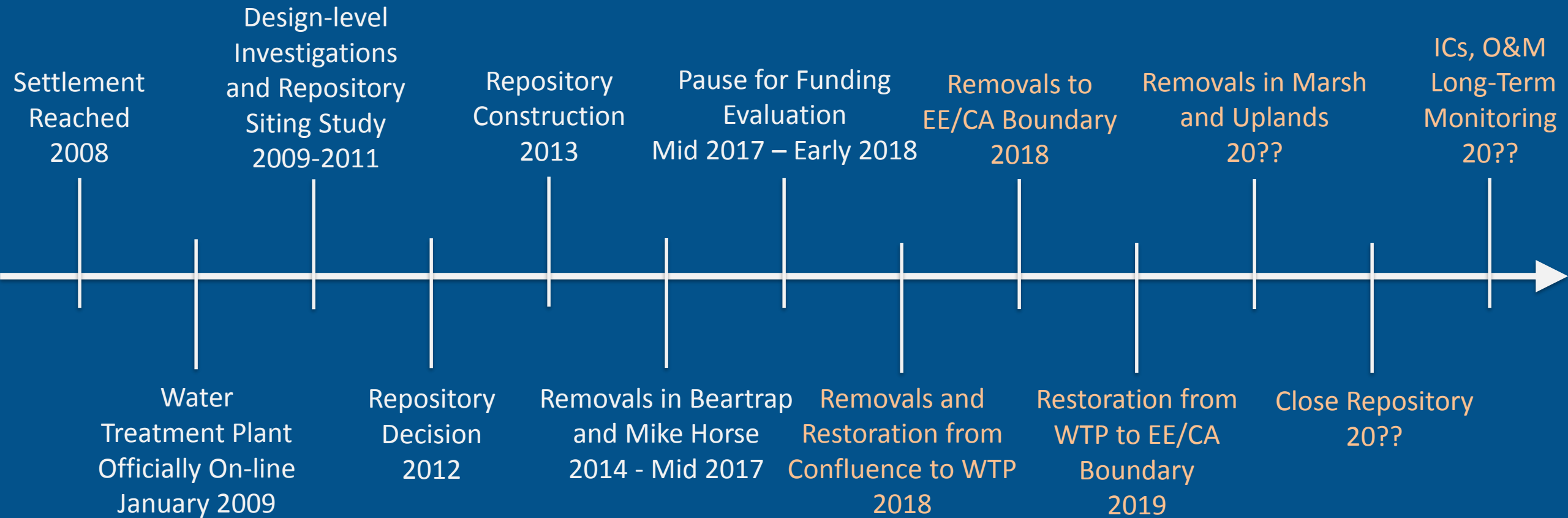
An additional \$1M was allocated to USFS for oversight of cleanup and restoration on NFS lands

Separate Settlement

\$10M – ASARCO for water treatment and management of former ASARCO lands, held by a trust set up for the benefit of the people of Montana and the United States



Timeline



Bankruptcy Settlement

- ✓ Removed nearly 700,000 CY of tailings contaminating the headwaters of the Blackfoot River
- ✓ Removed the dam 40 years after the initial failure (before the Jan 2016 earthquake)
- ✓ Removed the highest concentrations of contaminants from the headwaters
- ✓ Beartrap and Mike Horse Creeks are in the bottom of the valley for the first time in 75 years
- ✓ The WTP infrastructure is upgraded and has led to reduced maintenance
- ✓ Mike Horse Creek no longer enters the mine and a seep capture system was eliminated; should reduce costs at the WTP, and provide more clean surface water downstream
- ✓ Groundwater in Mike Horse Creek (at the horseshoe bend) meets drinking water standards – first time since 1994
- ✓ Minimal residual contamination in the surface water (expect further improvement with final upgrades to the upper seep capture system – completed Fall 2017)
- ✓ The repository is performing as expected, and came through the earthquakes with no impact



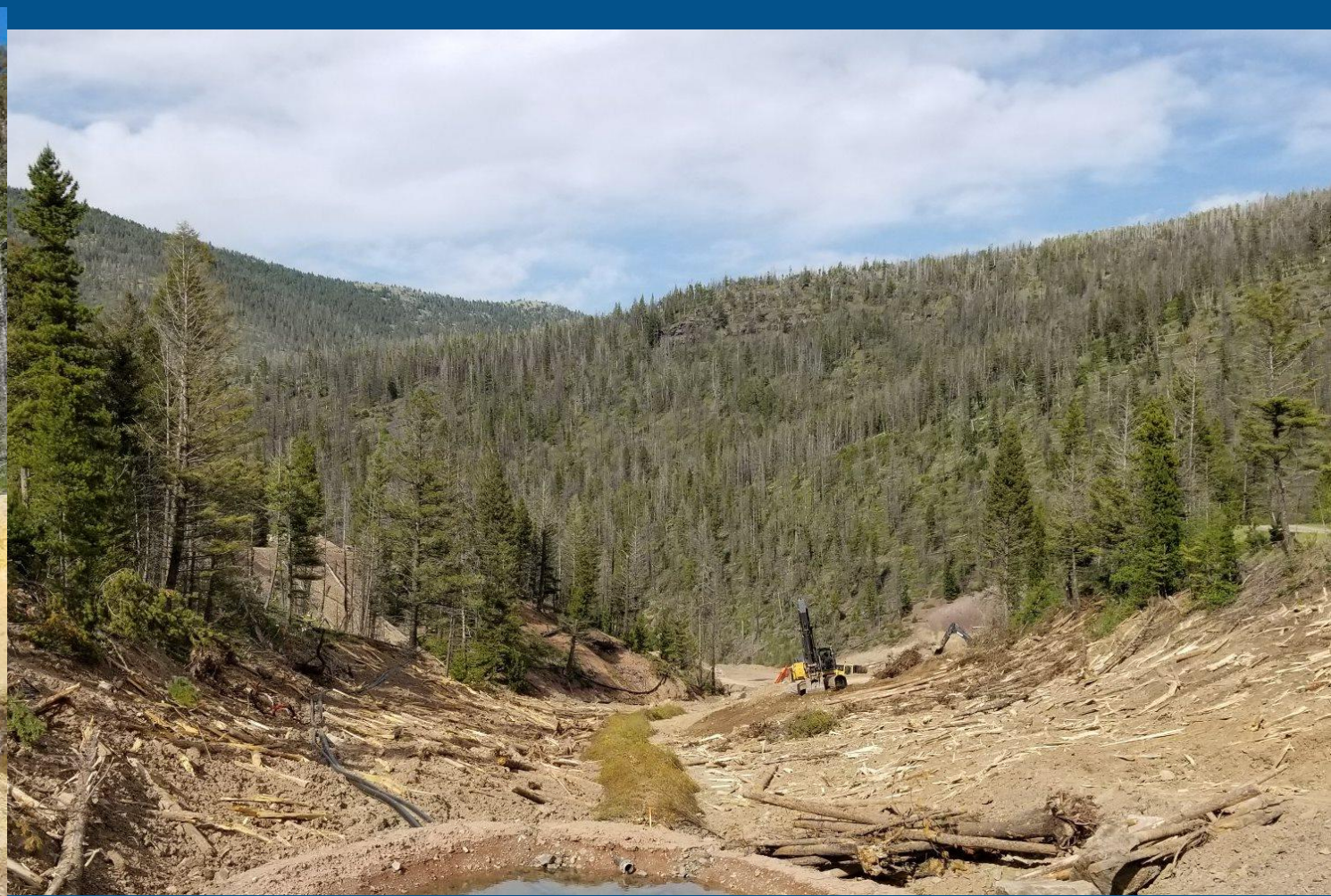
Beartrap



Mike Horse



Mike Horse



Mike Horse Results – Groundwater (mg/L)

| | Date | Aluminum | Arsenic | Cadmium | Copper | Iron | Lead | Manganese | Zinc |
|-----------|-----------|----------|---------|---------|--------|-------|---------|-----------|------|
| Standards | | 20 | 0.01 | 0.005 | 1.3 | 14 | 0.15 | 0.94 | 2 |
| Well | | | | | | | | | |
| MW-8 | 4/25/2017 | <0.03 | <0.003 | 0.00252 | 0.002 | <0.05 | <0.0005 | <0.005 | 0.76 |
| MW-8 | 3/13/2015 | <0.03 | <0.003 | 0.0303 | 0.016 | <0.05 | <0.0005 | <0.005 | 8.53 |
| MW-8 | 5/25/2001 | 0.096 | <0.005 | 0.22 | 0.16 | <0.05 | <0.003 | 0.98 | 46 |
| MW-8 | 5/7/1998 | 0.12 | <0.002 | 0.23 | 0.23 | <0.03 | <0.003 | 1.6 | 41 |
| MW-8 | 5/29/1997 | 0.072 | <0.002 | 0.2 | 0.14 | <0.03 | <0.003 | 1.9 | 50 |
| MW-8 | 5/24/1996 | <0.05 | <0.002 | 0.24 | 0.054 | <0.03 | <0.003 | 1.4 | 53 |
| MW-8 | 5/6/1995 | <0.05 | <0.002 | 0.12 | 0.029 | <0.03 | <0.003 | 0.22 | 29 |

Mike Horse Results – Surface Water (mg/L)

| | Date | Arsenic | Cadmium | Copper | Iron | Lead | Manganese | Zinc |
|--|-----------|---------|----------------|--------------|-------|---------------|-----------|-------------|
| Aquatic Chronic | | 0.15 | 0.0008 | 0.009 | 1 | 0.003 | - | 0.122 |
| Aquatic Acute | | 0.34 | 0.002 | 0.014 | - | 0.084 | - | 0.122 |
| Human Health | | 0.01 | 0.005 | 1.3 | 14 | 0.015 | 0.94 | 2 |
| Surface Water Site | | | | | | | | |
| BRSW-22 | 5/1/2017 | <0.003 | <u>0.00137</u> | 0.004 | 0.07 | 0.0012 | 0.008 | 0.31 |
| BRSW-22 | 5/12/2016 | <0.003 | 0.00305 | 0.038 | <0.03 | 0.002 | 0.054 | 0.47 |
| BRSW-22 | 5/19/2015 | <0.003 | 0.00381 | 0.054 | 0.04 | 0.0031 | 0.069 | 0.65 |
| BRSW-22 | 5/27/2014 | <0.003 | 0.00307 | 0.064 | 0.12 | <u>0.0184</u> | 0.073 | 0.49 |
| BRSW-22 | 5/24/2013 | <0.003 | 0.00390 | 0.044 | <0.03 | <u>0.0033</u> | 0.058 | 0.61 |
| BRSW-22 | 5/7/2012 | <0.003 | <u>0.00456</u> | 0.059 | <0.03 | <u>0.0033</u> | 0.072 | 0.76 |
| BRSW-22 | 4/30/2011 | <0.003 | 0.03080 | <u>0.031</u> | <0.03 | 0.0119 | 0.439 | 6.84 |
| Exceeds acute standard | | | | | | | | |
| <u>Exceeds chronic standard</u> | | | | | | | | |

Water Treatment Plant History

History

- Built in 2008, initially put online in January 2009
- Optimized in 2011/2012 to meet final discharge limits
 - Added a second neutralization tank for the addition of potassium permanganate and sodium sulfide (primarily to address remaining Cd above standards)
- 2016 remediation work removed the lower seep capture system and eliminated clean Mike Horse Creek water from entering the mine workings
- Added Cell 7 at the WTP for additional retention time; reduced chemicals necessary for appropriate reaction times and reduced the potential for buildup in ceramic filters

Stats

Earthquake: July 6, 2017

Highest amount of water treated in a year:

2017, 37M Gallons; 20M of that from July 6-Dec 31

Highest amount of water treated in a year, pre-earthquake:

2011, 34M Gallons, primarily from April through Aug

Water treated post-remediation of Mike Horse Creek:

2016, 6M Gallons, from July through Dec

Average water treated per year (excluding above outliers):

26M Gallons

Original Design Basis:

Average 63 gpm

Peak of 130 gpm

Historic Monthly Average Maximum during High Flow:

130-140gpm

Water Treatment Process

Water from sources to feed tank w/ aeration



Cell 7: reaction holding time



Concentration Tank

Sludge Tanks → Add Polymer → Filter Press → Disposal



pH Adjust Tank – add sulfuric acid

Neutralization Tank 1 – pH adjust w/ NaOH, sodium sulfide

Neutralization Tank 2 – potassium permanganate



Ceramic Micro-Filtration

Discharge to Blackfoot River

Ceramic Micro-Filtration Pumps and Filter Press w/ Finished Product



Remaining Work

Beartrap Creek below confluence with Mike Horse



Blackfoot River below the confluence of Beartrap and Anaconda Creeks and the water treatment plant

Volumes by Area

